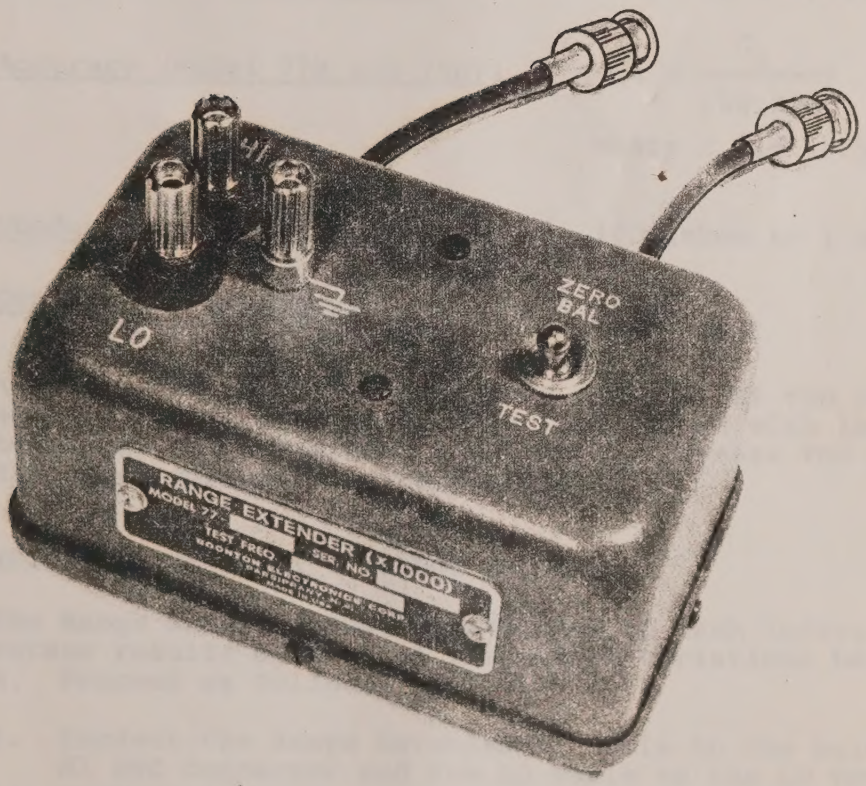
OPERATING INSTRUCTIONS

for

MODEL 77-2A
RANGE EXTENDER (1 MHz)



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OPERATING INSTRUCTIONS

MODEL 77-2A

1 MHz RANGE EXTENDER

I. GENERAL INFORMATION

The 77-2A Range Extender is designed for use with Models 75D and 77B 1 MHz Capacitance Bridges. The 77-2A multiplies their capacitance ranges and conductance ranges by a factor of 1000 (excluding their X1 capacitance ranges).

Specifications (including the Bridge)

Capacitance Measurements:	10 pF to 100,000 pF
Accuracy (Model 77B and 75D):	$\pm(1 + \frac{C_x}{100,000})$ % where C_x is in pF
Conductance Measurements:	100 μmhos to 1 mho
Conductance Accuracy:	±10%

Accuracy is specified for a test specimen at the junction of the test terminals. Lead inductance, associated with large capacitors, and low resistance effectively increase the measured capacitance and conductance, respectively.

II. INITIAL ADJUSTMENT OF RANGE EXTENDER

The Range Extender must be adjusted to each individual bridge for accurate results because of the slight variations between bridges. Proceed as follows:

1. Connect the Range Extender HI cable to the bridge HI BNC connector and the LO cable to the LO BNC connector.
2. Set the Range Extender toggle switch to ZERO BAL.
3. Set the Range Extender ADJ L/NORMAL switch to ADJ L.
4. Set the bridge TEST LEVEL control to maximum (fully clockwise).

5. Set the bridge MULTIPLY C switch to 1.

6. Set the bridge DIVIDE G/MULTIPLY R switch to 1.

7. Set the bridge CAPACITANCE and CONDUCTANCE dials to zero.

8. Null the bridge using the C ZERO and R/G ZERO controls. If a null cannot be achieved, use the CAPACITANCE and CONDUCTANCE controls to null the bridge. However, the amount of offset on the CAPACITANCE dial must be added or subtracted from the final reading.

9. Set the Range Extender toggle switch to TEST.

10. Adjust the CAPACITANCE and CONDUCTANCE controls on the bridge for a null indication. The CAPACITANCE dial reading should agree with the value stamped on the Range Extender's calibration plate. If the two values do not concur, proceed as follows:

    a. Set the CAPACITANCE control to the value indicated on the calibration plate.

    b. Pry off the plug from the cutout next to the ADJ L/NORMAL switch on the Range Extender.

    c. Insert a nonmetallic alignment tool into the cutout and adjust the inductance slug for a null indication on the bridge.

    d. Replace the plug.

NOTE:

The Range Extender need not be calibrated again unless it is used with a different bridge.

III. MEASURING WITH THE RANGE EXTENDER

1. Set the ADJ L/NORMAL switch to the NORMAL position.

2. Connect the test specimen between the HI and LO terminals of the Range Extender.

3. Set the ZERO BAL/TEST switch to ZERO BAL.

4. Zero balance the bridge with the C ZERO and R/G ZERO controls. If zero balance cannot be achieved, set up an initial offset using the main C and G controls and correct the final readings by the amount of the offsets.

5. Set the ZERO BAL/TEST switch to TEST.

6. Null the bridge using the CAPACITANCE and CONDUCTANCE controls.

7. The test values are read from the bridge and multiplied by 1000. The final value of conductance then is determined by applying the following correction which is subtracted from the conductance value after the dial reading has been multiplied by 1000.

$$3.5\left(\frac{C_x}{1000}\right)^2 \quad \text{(umhos)}$$

where C_x is in pF

This correction is required because the series resistance of the connecting cables cannot be neutralized.

8. When using the Range Extender with the Model 77B Capacitance Limit Bridge, the bridge must be operated in the conventional manual (tolerance out) mode. Only the panel meter should be used to detect balance. The limit lights are operated by the phase sensitive detector and will not necessarily show the correct null.

NOTE:

For maximum accuracy zero balance the bridge in accordance with steps 1 through 4 before each new test.

IV. TEST SIGNAL

The signal level at the test specimen is 1/1000 of the level appearing between the LO terminal and ground of the bridge. The level at the test specimen may be measured by connecting a sensitive RF voltmeter between the LO test terminal on the Range Extender and ground.

V. DC BIAS

Both the internal and external bias facilities of a bridge are retained when the Range Extender is used. Bias current may be measured from the bridge panel jack in the usual manner. Bias voltage must be measured directly across the test specimen because of additional series resistance introduced into the bias path by the extender. A high resistance voltmeter should be used for this measurement and it must be disconnected when reading C and G of the test specimen.

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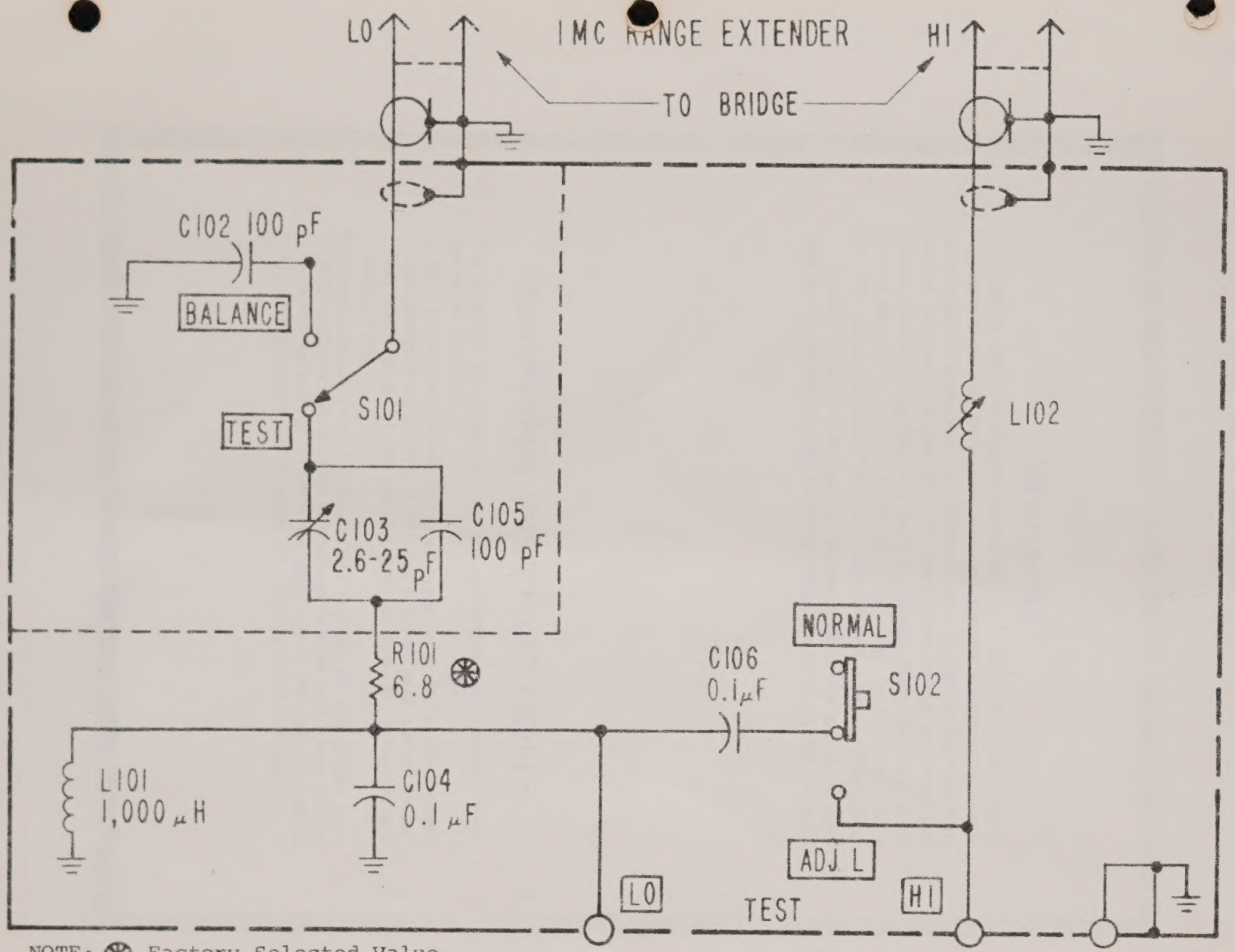
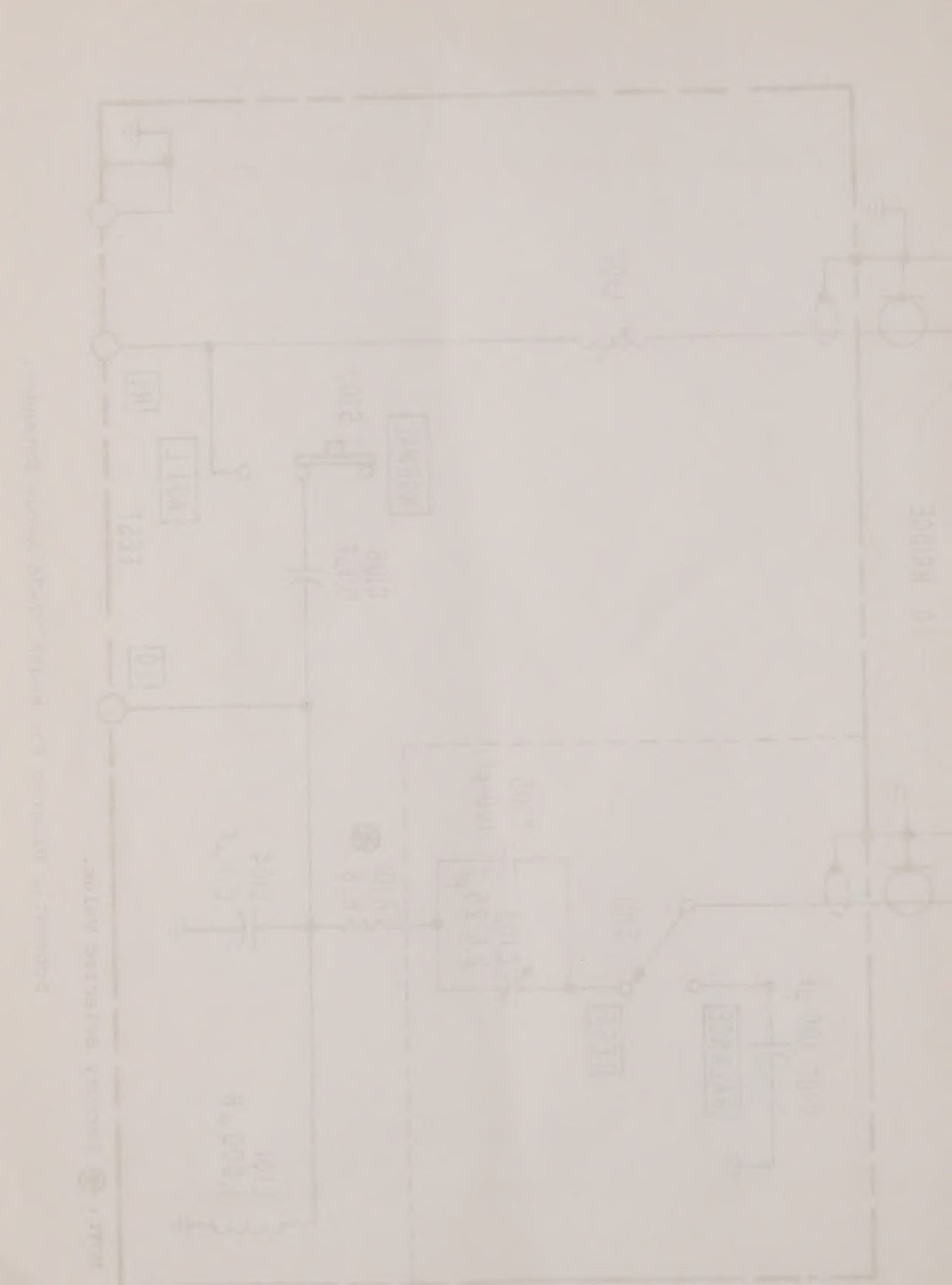


NOTE: ⊛ Factory Selected Value.

Schematic Diagram for Model 77-2A Range Extender.



Warranty

Boonton Electronics Corporation warrants its products to the original Purchaser to be free from defects in material and workmanship and to operate within applicable specifications for a period of one year from date of shipment, provided they are used under normal operating conditions. This warranty does not apply to vacuum tubes that have given normal service, to sealed assemblies which have been opened, or to any item which has been repaired or altered without our authorization.

We will repair or, at our option, replace at no charge any of our products which are found to be defective under the terms of this warranty.

SHIPPING INSTRUCTIONS

If it becomes necessary to ship the instrument, the following steps should be followed:

a. Wrap the instrument with heavy wrapping paper and seal the seams with gummed tape. Place in fibreboard carton large enough to permit three inches of soft packing material between instrument and sides of box.

b. Alternatively Boonton Electronics will provide an appropriate shipping container and packing materials at nominal cost. These may be obtained by writing to the Sales Department, Boonton Electronics Corporation, Route 287 at Smith Rd., Parsippany, N. J. 07054.